

CLAIMS

What is claimed is:

1. A foundry casting material for use in making a mold for a cast part, comprising:
 - (a) foundry sand;
 - (b) binder; and
 - (c) a disintegration additive.
2. A foundry casting material according to Claim 1, wherein the material forms a core of the mold.
3. A foundry casting material according to Claim 1, wherein the cast part comprises a metal.
4. A foundry casting material according to Claim 1, wherein the cast part is an automotive drive train part.
5. A foundry casting material according to Claim 1, wherein said disintegration additive enhances electron/ion conduction when the casting material is immersed in water.

6. A foundry casting material according to Claim 5, wherein said disintegration additive is a salt.
7. A foundry casting material according to Claim 1, wherein said disintegration additive promotes disintegration of the casting material during an electrolytic cleaning process.
8. A foundry casting material according to Claim 1, wherein said disintegration additive volatilizes during the process of making said part.
9. A foundry casting material according to Claim 1, wherein said disintegration additive is a salt.
10. A foundry casting material according to Claim 9, wherein said salt comprises sodium.
11. A foundry casting material according to Claim 10, wherein said salt is selected from the group consisting of: sodium chloride, sodium carbonate, sodium bicarbonate, sodium diphosphate, and mixtures thereof.
12. A foundry casting material according to Claim 9, wherein said salt comprises potassium.

13. A foundry casting material according to Claim 9, wherein the salt comprises carbonate.
14. A foundry casting material according to Claim 9, wherein the salt comprises phosphate.
15. A foundry casting material according to Claim 1, wherein said disintegration additive is an electrolyte salt.
16. A foundry casting material according to Claim 9, wherein the disintegration additive is selected from the group consisting of: sodium carbonate, sodium chloride, sodium hydroxide, sodium iodide, sodium nitrate, sodium phosphate, sodium sulfate, potassium carbonate, potassium chloride, potassium hydroxide, potassium iodide, potassium nitrate, potassium phosphate, potassium sulfate, calcium carbonate, calcium chloride, calcium hydroxide, calcium iodide, calcium nitrate, calcium sulfate, ammonium sulfate, ammonium carbonate, magnesium carbonate, magnesium chloride, magnesium hydroxide, magnesium iodide, magnesium nitrate, magnesium phosphate, magnesium sulfate, and mixtures thereof.
17. A foundry casting material according to Claim 1, wherein said foundry sand comprises a synthetic sand.

18. A foundry casting material according to Claim 1, wherein said foundry sand comprises a bank sand.
19. A foundry casting material according to Claim 1, wherein said foundry sand comprises a silica sand.
20. A foundry casting material according to Claim 1, wherein said binder comprises a phenolic urethane resin.
21. A foundry casting material according to Claim 1, wherein said binder comprises a clay.
22. A foundry mold formed for the casting of a part, comprising a mixture of:
 - (a) a foundry sand;
 - (b) a binder; and
 - (c) a disintegration additive,wherein said mixture is treated to form a solid.
23. A foundry mold according to Claim 22, wherein said cast part comprises a metal.
24. A foundry mold according to Claim 23, wherein said cast part is an automotive drive train part.

25. A foundry mold according to Claim 22, wherein said disintegration additive enhances electron/ion conduction when said casting material is immersed in water.
26. A foundry mold according to Claim 22, wherein said disintegration additive promotes disintegration of said cast material during an electrolytic cleaning process.
27. A foundry mold according to Claim 22, wherein said disintegration additive volatilizes during the process of making said cast.
28. A foundry mold according to Claim 22, wherein said disintegration additive is a salt.

29. A foundry mold according to Claim 28, wherein the disintegration additive is selected from the group consisting of: sodium carbonate, sodium chloride, sodium hydroxide, sodium iodide, sodium nitrate, sodium phosphate, sodium sulfate, potassium carbonate, potassium chloride, potassium hydroxide, potassium iodide, potassium nitrate, potassium phosphate, potassium sulfate, calcium carbonate, calcium chloride, calcium hydroxide, calcium iodide, calcium nitrate, calcium sulfate, ammonium sulfate, ammonium carbonate, magnesium carbonate, magnesium chloride, magnesium hydroxide, magnesium iodide, magnesium nitrate, magnesium phosphate, magnesium sulfate, and mixtures thereof.
30. A foundry mold according to Claim 22, wherein said foundry sand comprises a material selected from the group consisting of: synthetic sand, bank sand, silica sand, and mixtures thereof.
31. A foundry mold according to Claim 22, wherein said binder comprises a material selected from the group consisting of: phenolic urethane resin, clay, and mixtures thereof.

32. A method of forming a metal part comprising:
 - (a) pouring molten metal into a mold, wherein said mold is formed of a material comprising foundry sand, binder, and a disintegration additive;
 - (b) cooling said molten metal to form a solid; and
 - (c) removing the solid from said mold.
33. A method of forming a metal part according to Claim 32, wherein said removing step further comprises:
 - (i) physically separating said solid from said mold, to expose a metal part, wherein residual mold material remains on a surface of the metal part;
 - (ii) attaching the metal part to a power source having a first and a second electrode of opposite polarities, wherein said first electrode is attached to the metal part;
 - (iii) contacting the metal part with an electrolyte, wherein said electrolyte is in contact with said second electrode; and
 - (iv) generating current through said electrolyte, from said first electrode to said second electrode.

34. A method of forming a metal part according to Claim 33, wherein said electrolyte comprises a salt selected from the group consisting of: sodium carbonate, sodium bicarbonate, disodium phosphate, and mixtures thereof.
35. A method of forming a metal part according to Claim 34, wherein said salt is sodium carbonate.
36. A method of forming a metal part according to Claim 33, wherein said first electrode is a cathode.
37. A method of forming a metal part according to Claim 33, wherein said contacting is by immersing said metal part in a reservoir of said electrolyte.
38. A method of forming a metal part according to Claim 33, wherein said contacting is by spraying said electrolyte on a surface of said metal part.
39. A method of forming a metal part according to Claim 32, wherein said metal part is an automotive drive train part.

40. A method of forming a metal part according to Claim 33, wherein said disintegration additive enhances electron/ion conduction when said casting material is contacted with said electrolyte.
41. A method of forming a metal part according to Claim 33, wherein said disintegration additive promotes disintegration of said cast material during said removing step.
42. A method of forming a metal part according to Claim 32, wherein said disintegration additive volatilizes during the process of making said cast.
43. A method of forming a metal part according to Claim 32, wherein said disintegration additive is a salt.

44. A method of forming a metal part according to Claim 43, wherein the disintegration additive is selected from the group consisting of: sodium carbonate, sodium chloride, sodium hydroxide, sodium iodide, sodium nitrate, sodium phosphate, sodium sulfate, potassium carbonate, potassium chloride, potassium hydroxide, potassium iodide, potassium nitrate, potassium phosphate, potassium sulfate, calcium carbonate, calcium chloride, calcium hydroxide, calcium iodide, calcium nitrate, calcium sulfate, ammonium sulfate, ammonium carbonate, magnesium carbonate, magnesium chloride, magnesium hydroxide, magnesium iodide, magnesium nitrate, magnesium phosphate, magnesium sulfate, and mixtures thereof.
45. A method of forming a metal part according to Claim 32, wherein said binder comprises a material selected from the group consisting of phenolic urethane resin, clay, and mixtures thereof.

46. A method of removing residual casting material from a metal part, the method comprising the steps of:
 - (a) attaching the metal part having residual casting material to a power source having a first and a second electrode of opposite polarities, wherein said first electrode is attached to the metal part;
 - (b) contacting said metal part with an electrolyte, wherein said electrolyte is in contact with said second electrode; and
 - (c) generating current through said electrolyte, from said first electrode to said second electrode;wherein said residual casting material is made from a mixture comprising casting sand, binder and a disintegration additive.
47. A method of removing residual casting material according to Claim 46, wherein said contacting is by immersing said metal part in a reservoir of said electrolyte.
48. A method of removing residual casting material according to Claim 46, wherein said contacting is by spraying said electrolyte on a surface of said metal part.

49. A method of removing residual casting material according to Claim 46, wherein said electrolyte comprises a salt selected from the group consisting of: sodium carbonate, sodium bicarbonate, disodium phosphate, and mixtures thereof.
50. A method of removing residual casting material according to Claim 49, wherein said salt is sodium carbonate.
51. A method of removing residual casting material according to Claim 46, wherein said first electrode is a cathode.
52. A method of removing residual casting material according to Claim 46, wherein said metal part is an automotive drive train part.
53. A method of removing residual casting material according to Claim 46, wherein said disintegration additive enhances electron/ion conduction when said casting material is contacted with said electrolyte.
54. A method of removing residual casting material according to Claim 46, wherein said disintegration additive promotes disintegration of said cast material during said removing step.

55. A method of removing residual casting material according to Claim 46, wherein said disintegration additive volatilizes during the process of making said cast.
56. A method of removing residual casting material according to Claim 46, wherein said disintegration additive is a salt.
57. A method of removing residual casting material according to Claim 56, wherein the disintegration additive is selected from the group consisting of: sodium carbonate, sodium chloride, sodium hydroxide, sodium iodide, sodium nitrate, sodium phosphate, sodium sulfate, potassium carbonate, potassium chloride, potassium hydroxide, potassium iodide, potassium nitrate, potassium phosphate, potassium sulfate, calcium carbonate, calcium chloride, calcium hydroxide, calcium iodide, calcium nitrate, calcium sulfate, ammonium sulfate, ammonium carbonate, magnesium carbonate, magnesium chloride, magnesium hydroxide, magnesium iodide, magnesium nitrate, magnesium phosphate, magnesium sulfate, and mixtures thereof.
58. A method of removing residual casting material according to Claim 46, wherein said foundry sand comprises a material selected from the group consisting of synthetic sand, bank sand, silica sand, and mixtures thereof.

59. A method of removing residual casting material according to Claim 46, wherein said binder comprises a material selected from the group consisting of phenolic urethane resin, clay, and mixtures thereof.